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1. Rigoutsos '99 does not teach or suggest a "system for identifying genes"

Applicant noted that claim 1 recites a "system for identifying genes". However, Rigoutsos '99 has nothing to do with "identifying genes". Indeed, this is clear from the title of Rigoutsos '99 which is "*Building Dictionaries Of 1D and 3D Motifs By Mining The Unaligned 1D Sequences of... Genomes*". That is, Rigoutsos '99 deals with building dictionaries of motifs (i.e., from amino acid sequences), not identifying genes.

In fact, Rigoutsos '99 discloses a process that may be used to create a pattern database such as the pattern database used in the claimed invention. Indeed, Rigoutsos '99 is summarized on page 224, col. 1 which states "*[w]e report on the properties of the entries of these two dictionaries, the extent to which the 1D seqlets have instances in the Protein Data Bank, and the ramifications from the induced coverage. We also present several entries of the generated dictionaries and discuss uses*". As is clear from this summary, Rigoutsos '99 has nothing to do with 1) inputting a genomic DNA sequence, 2) translating an ORF of the DNA sequence into an amino acid translation, 3) locating in the amino acid translation occurrences of patterns from the pattern database, or 4) determining whether the ORF includes a putative gene.

In fact, attached hereto is a flowchart which summarizes the steps described by Rigoutsos '99 in building the 1D and 3D dictionaries. This flowchart clearly shows that Rigoutsos '99 has nothing to do with identifying genes and clearly does not teach or suggest the claimed invention.

2. Rigoutsos '99 does not teach or suggest "inputting a genomic DNA sequence"

The Examiner relies on two simple words in the Abstract to support his position that Rigoutsos '99 teaches a DNA sequence. Specifically, the Examiner alleges that the phrase "genomic input" in line 6 of the Abstract necessarily implies DNA.

However, Applicant would point out that the term "genomic input" is modified by the language following it. That is, the complete term used in the Abstract is "genomic input at the

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level of amino acid positions", which makes clear that the input in Rigoutsos '99 is not a DNA sequence (indeed, the purpose of the Rigoutsos '99 paper is to build a dictionary of motifs from amino acid sequences not from DNA sequences).

Moreover, even assuming (arguendo) that the Abstract may be construed as disclosing a DNA sequence, the remainder of Rigoutsos '99 makes it abundantly clear that only amino acid sequences are being input, not DNA sequences. Indeed, for example, on page 225, Rigoutsos '99 states that

"[t]he database that we used as the input to Teiresias comprised the ORFs from the 17 complete and publicly available archaeal and bacterial genomes. In particular, the database contained: 4289 ORFs from Escherichia coli with 1358990 [amino acids] ..."

Indeed, nowhere in Rigoutsos '99 is the term DNA even used. Instead, Rigoutsos '99 only refers to amino acid sequences. Thus, it is clear that contrary to the Examiner's allegations Rigoutsos '99 does not teach or suggest inputting a DNA sequence.

3. Rigoutsos '99 does not teach or suggest translating an ORF of the input DNA sequence into an amino acid translation

The Examiner's position here is unclear. The Examiner first indicates on page 3 of the Office Action that this feature is disclosed at page 224, col. 1, lines 6-40. However, later on page 3 the Examiner concedes that Rigoutsos '99 "does not explicitly describe the limitation of 'translates an open reading frame'", but implies that this feature is inherent from the disclosure on page 225, column 2.

However, Applicant would submit that nowhere does col. 1 on page 224 or col. 2 (the "Database" Section) on page 225 teach or suggest translating an ORF of an input DNA sequence into an amino acid translation. Indeed, col. 1 on page 224 merely states that 1) a database containing the ORFs for the complete genomes of 13 bacteria were compiled, 2) the database was processed to produce a dictionary of seqlets, and 3) the seqlets were aligned in three-dimensional

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space. Further, as noted above, the "Database" Section on page 225 merely states that:

"[t]he database that we used as the input to Teiresias comprised the ORFs from the 17 complete and publicly available archaeal and bacterial genomes. In particular, the database contained: 4289 ORFs from Escherichia coli with 1358990 [amino acids] ..."

Nowhere in these passages does Rigoutsos '99 even mention translating an ORF of an input DNA sequence into an amino acid translation. In fact, the Examiner seems to imply (in paragraph 7 on page 3 of the Office Action) that Rigoutsos '99 discloses amino acid sequences, and that somebody had to have translated these amino acid sequences from a DNA sequence at some point, then Rigoutsos '99 discloses translating a DNA sequence into an amino acid translation.

However, the Examiner is missing an important point. It is not any old DNA sequence that is being translated in the claimed invention. Instead, the claim recites **translating an ORF of the input DNA sequence into an amino acid translation**. That is, it is an ORF of the input (e.g., query) DNA sequence under examination that is being translated.

That is, even assuming (arguendo) that the amino acid sequences in Rigoutsos '99 were at some point in time translated from a DNA sequence, nowhere does Rigoutsos '99 teach or suggest a system which inputs a DNA sequences and translates an ORF of that input sequence into an amino acid sequence.

4. **Rigoutsos '99 does not teach or suggest locating in the amino acid translation occurrences of patterns from the pattern database to determine whether the ORF includes a putative gene**

Applicant would point out that this element of the claimed invention may be considered to have two parts:

- 1) locating occurrences of patterns from the pattern database in the amino acid

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translation; and

2) determining (e.g., based on whether the patterns occur in the amino acid translation) whether the ORF includes a putative gene.

The Examiner alleges in the Office Action that this element is taught at page 228, col. 2, lines 4-11 in Rigoutsos '99. However, this passage merely reads (in pertinent part)

"[o]ne of the seqlets that are discovered when we process the input database is and is present in the following ten ORFs: Of these, gi_3328856 and gi_3329230 are annotated as Fe-S oxidoreductases."

That is, this simple passage clearly does not teach or suggest 1) locating occurrences of patterns from the pattern database in the amino acid translation, or 2) determining whether the ORF includes a putative gene.

When asked at the interview where in this passage these features are disclosed, he Examiner stated at the features were disclosed "at other places" in Rigoutsos '99. Applicant respectfully requested that, in a next office action, the Examiner more clearly indicate the specific disclosure in Rigoutsos '99 on which the Examiner was relying as disclosing these features of the claimed invention.

First, this passage clearly does not teach or suggest locating occurrences of patterns from the pattern database in the amino acid translation. Indeed, nowhere does this passage discuss "locating" anything, let alone locating occurrences of "patterns" in an amino acid translation (from the input DNA sequence).

Further, the Examiner seems to misunderstand the term "putative gene". Indeed, the Examiner seems to imply that this passage in Rigoutsos '99 teaches identifying a putative gene from the mere disclosure that two amino acid sequences (gi_3328856 and gi_3329230) are annotated as oxidoreductases. This is clearly unreasonable.

Indeed, an oxidoreductase is simply an enzyme that catalyzes the transfer of electrons from one molecule to another. An enzyme may be but is not necessarily a protein.

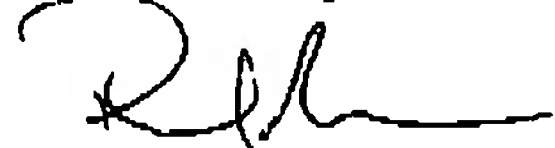
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The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Assignee's Deposit Account No. 50-0510.

Respectfully Submitted,

Date: 6/22/06



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CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that the foregoing was filed by facsimile with the United States Patent and Trademark Office, Examiner C. Dune Ly, Group Art Unit # 2168 at fax number 571-272-8300 this 22nd day of June, 2006.



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